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GB 2274698 A GB 2246407 A GB 1455295 A
GB 1067091 A GB 0655974 A

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INT CL[5] A47B , F16B
ONLINE DATABASES: WPI

# (54) Modular furniture systems

(57) A modular furniture system includes an apparatus for attaching a module (eg a shelf or a draw) to a frame. The apparatus is accommodated by the module and comprises a locating member (5) eg for hooking over a ladder type support frame, a retaining member (7) eg in the form of a nut and a support member (6). The locating member has a hook (8) to locate over a bar of a frame. Rotation of the retaining member draws the hook towards or away from the module, and thereby locates and secures the module. A shelf may be supported between ladder type frames or may be mounted in cantilever fashion.

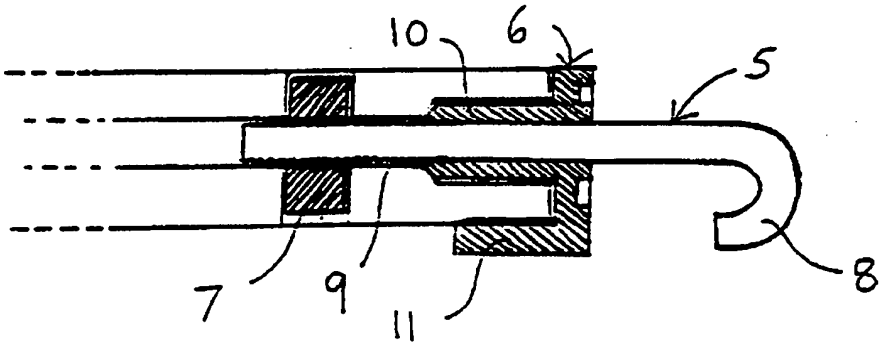


Fig. 6b

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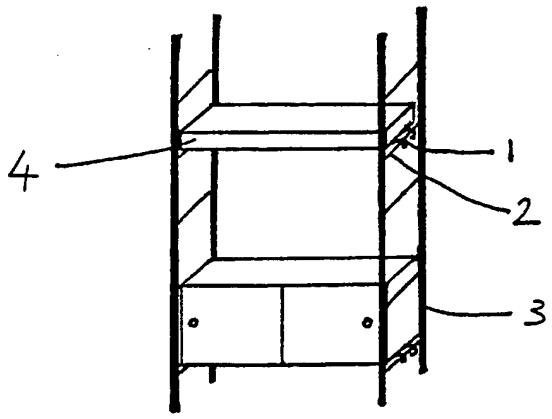



Figure 1

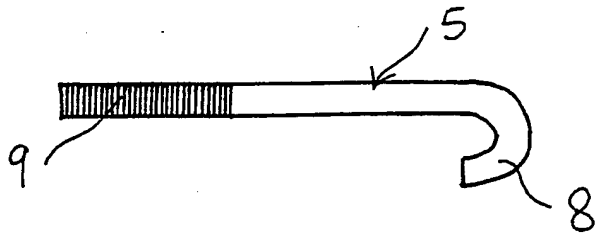



Figure 2

Fig. 3a

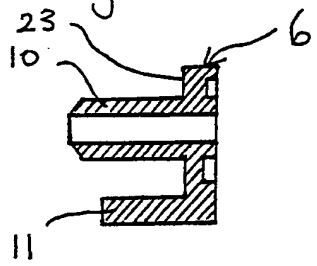



Fig. 3b

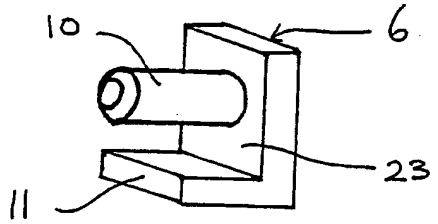



Fig. 4a

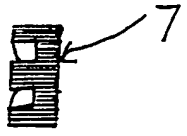



Fig. 4b

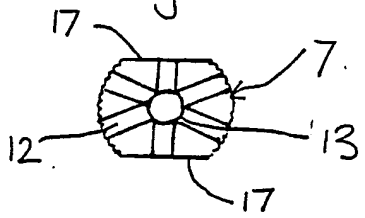



Fig. 4c

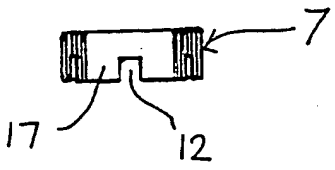
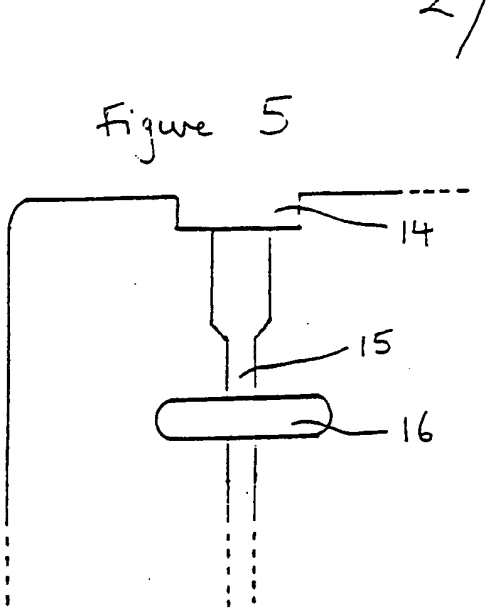


Figure 5



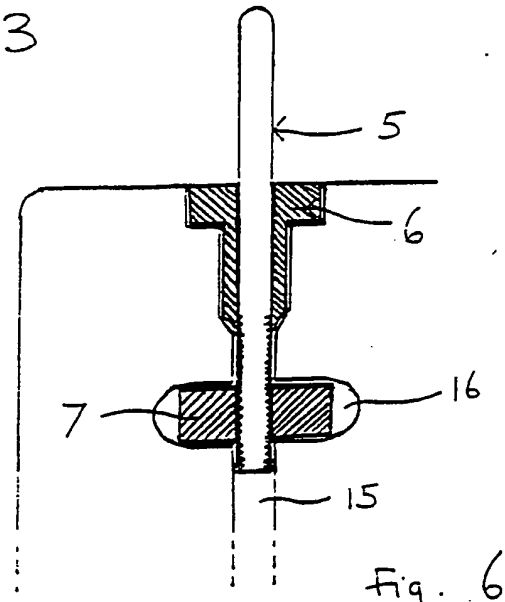




Fig. 6a

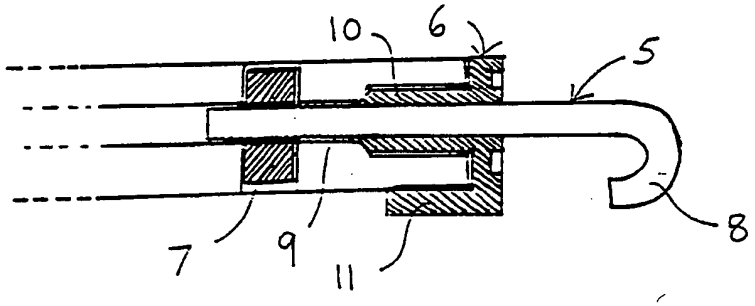



Fig. 6b

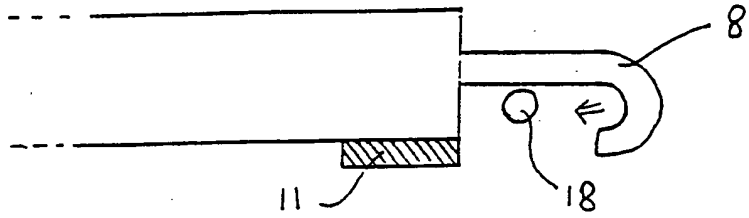



Fig. 7a

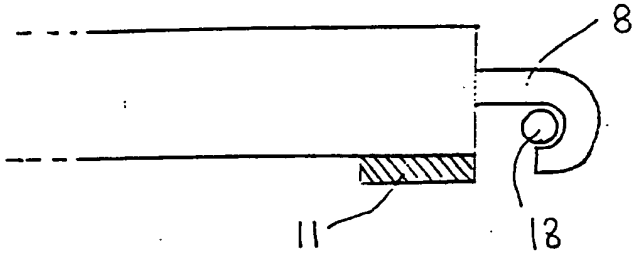



Fig. 7b

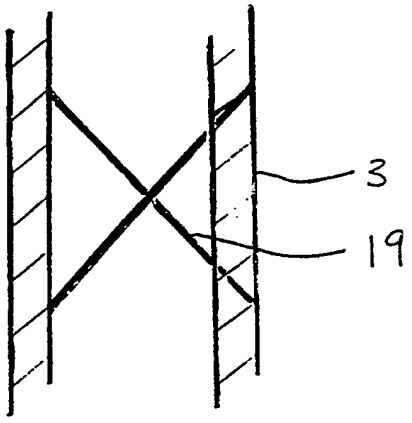



Figure 8
Prior Art

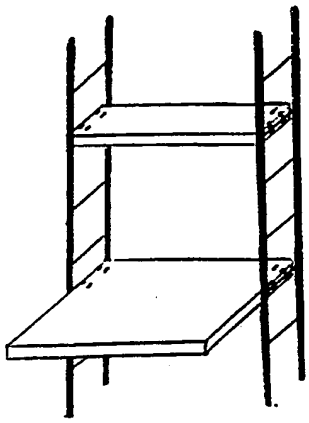


Figure 9

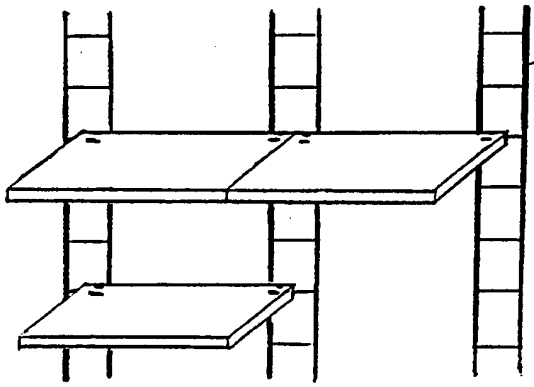
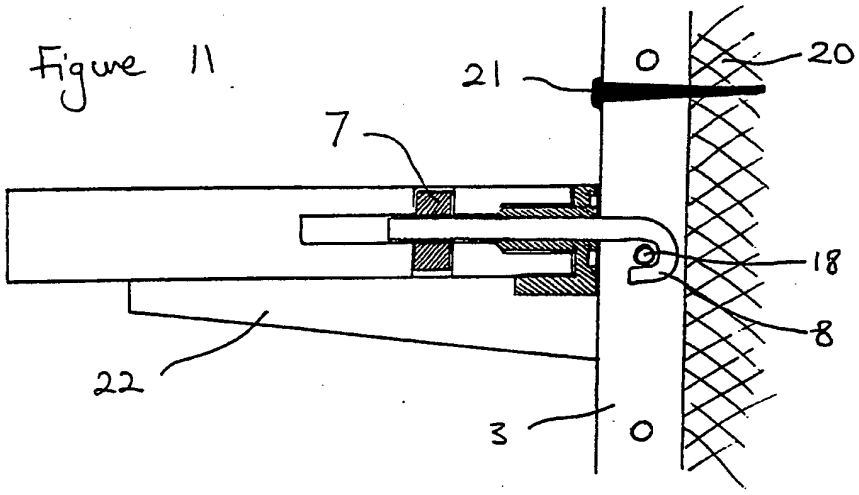



Figure 10

Figure 11



MODULAR FURNITURE SYSTEMS

This invention relates to modular furniture systems. In particular it relates to apparatus for connecting the various parts forming a modular system. In one example it relates to shelf attaching apparatus for shelving systems.

Furniture systems are known which comprise a plurality of frames having modules, such as shelves or cabinets, supported between them. One such system is sold under the trade mark LADDEREX. This particular system comprises ladder-style metal frames, metal support rods, and modules having grooves on their underside to accommodate the metal rods. As shown in Figure 1, on each end of a metal rod is a hook (1) which is located over a bar (2) on a frame (3) in order to support a shelf (4) between two frames. It is possible to support a plurality of modules between pairs of frames as well as to extend the system by linking modules to further frames. A disadvantage of this system is instability. It is relatively easy for a metal support rod to disengage itself from the cabinet or shelf it supports so that the system becomes a safety hazard, especially if knocked. Additionally, shelves may rotate about their metal support rod if they are leaned upon, for example.

It is an object of the present invention to provide a more secure and therefore safer modular furniture system.

According to the present invention there is provided an apparatus for attaching a module to a frame comprising; a locating member having a first portion for locating on a frame; a retaining member adapted to retain the locating member and to enable the first portion of the locating member to be drawn towards or away from the module; and a support member having a portion adapted to lie within the body of the module and having an internal

bore to accommodate therethrough an intermediate part of the locating member between the first portion and the retaining member.

The first portion of the locating member may comprise a hook to locate over a bar of a frame. The locating member may also include a shaft having an external screw thread to cooperate with the retaining member having a corresponding internal screw thread. The retaining member may then be rotatable by finger pressure or, preferably, by a screwdriver tip or similar instrument to draw the first portion towards or away from the module. Alternatively, the locating member may be otherwise adapted to cooperate with the retaining member, for example by a cam mechanism. The support member may include a cylindrical hollow projection to fit within the module and to accommodate the shaft of the locating member therethrough. It may also include at least one portion to clip around an edge of the module.

According to the present invention there is further provided a modular furniture system comprising; at least one frame; at least one module; and at least one attaching apparatus comprising, a locating member having a first portion for locating on the frame, a retaining member positioned within the module and being externally accessible and being adapted to retain the locating member and to enable the first portion of the locating member to be drawn towards or away from the module; and a support member having a portion lying within the body of the module and having an internal bore to accommodate therethrough an intermediate part of the locating member between the first portion and the retaining member.

In addition, the modular furniture system may comprise a cover piece for fitting to the module to prevent access to the retaining member. It may also comprise a bracket to fix to the underside of the module

for support.

In a further aspect there is provided a module adapted to accommodate an attaching apparatus therefor, said apparatus comprising a locating member having a first portion for locating on a frame, a retaining member positioned within the module and being externally accessible and being adapted to retain the locating member and to enable the first portion of the locating member to be drawn towards or away from the module, and a support member having a portion lying within the body of the module and having an internal bore to accommodate therethrough an intermediate part of the locating member between the first portion and the retaining member.

The module may be a shelf, a cabinet or a draw support, for example.

An embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a known modular furniture system;

Figure 2 shows a locating member;

Figure 3a shows a cross-sectional side view of a support member;

Figure 3b shows a perspective view of a support member;

Figure 4a shows a side view of a retaining member;

Figure 4b shows a front view of a retaining member;

Figure 4c shows a top view of a retaining member;

Figure 5 shows a horizontal cross-sectional view of part of a shelf;

Figures 6a and 6b show respective horizontal and vertical cross-sectional views of a shelf including apparatus for attaching it to a frame bar;

Figures 7a and 7b show side views of a shelf being attached to a frame bar with the attaching apparatus in an 'unlocked' and 'locked' position respectively;

Figure 8 shows a known modular furniture system having cross-members;

Figure 9 shows a modular furniture system according to the present invention;

Figure 10 shows a modular furniture system according to an alternative embodiment of the present invention; and

Figure 11 shows a vertical cross-sectional view of a shelf fixed to a frame using the attaching apparatus and supported by a bracket.

Referring to Figures 2 to 4, a module attaching apparatus in accordance with the present invention comprises a locating member 5, a support member 6 and a retaining member 7. In this particular embodiment of the invention, the locating member 5 comprises a shaft having a hook 8 at one end and an external screw thread 9 at the other end. In one example, the shaft may have a diameter of 5 mm and the screw thread may have a pitch of 0.5 mm. Preferably, the locating member is made of metal or of a strong plastics material.

The support member 6 includes an internal bore, preferably formed by a substantially cylindrical hollow projection 10 from a face portion 23 which projection is suitable in diameter for the shaft of the locating member 5 to pass therethrough. The support member therefore helps to guide the shaft of the locating member into the module. The support member also includes a portion 11 which acts as a clip with the edge of a shelf. This clip is typically rectangular but may be of other shapes. Clip 11 helps to prevent the shelf material, which may be, for example, chipboard or fibreboard, from disintegrating under the weight of the load carried by the shelf. The

clip achieves this by distributing the weight of the load more evenly within the shelf material. Support member 6 also relieves pressure in the shelf, which is usually wood-based, by protecting the shelf material from the wear and tear which could be caused by the shaft of the locating member bearing the weight of the shelf if there were no such support member used. Preferably, the support member is of resilient plastics material such as nylon, for example, or a metal such as diecast aluminium.

The retaining member 7 has grooves 12 extending on one face between diametrically opposed edges, thereby forming grooves in the sides of the retaining member which are suitable for receiving the tip of a screwdriver or similar instrument. The centre of the retaining member includes an internal screw thread 13 which is suitable in diameter to cooperate with the external screw thread 9 of the locating member 5. The retaining member in this embodiment is therefore essentially a nut. The edges of the retaining member are substantially knurled other than at two, opposed flats 17. The retaining member may be entirely of metal or of strong plastics material, or it may be substantially of plastics material with a metallic inner liner bearing the screw thread, for example.

Figure 5 shows the corner of a shelf. Three holes 14, 15 and 16 are made in the shelf in order to snugly accommodate the three components of the attaching apparatus in their respective positions. Hole 14 is formed by a rectangular cut-out portion in the side of the shelf to be adjacent to a frame. A cylindrical hole 15 is drilled into the shelf from hole 14 in a direction perpendicular to the side of the shelf. The end of hole 15 adjacent to hole 14, is widened in order to accommodate the cylindrical projection 10 of the support member 6: Hole 14 is shaped to accommodate the main body of said member 6. Hole 15 is of sufficient length and diameter to

accommodate axially the shaft of the locating member 5 whether the attaching apparatus be in a 'locked' or an 'unlocked' position. Hole 16 is cut completely through the shelf and is shaped to accommodate the retaining member 7 such that the axis of said member is coaxial with hole 15 which substantially bisects hole 16.

To assemble the attaching apparatus with the shelf, or another module, main face 23 of the support member 6 is fixed to the side of the shelf. In some embodiments the member may be glued, or otherwise affixed, but normally friction alone will be sufficient to retain the member. As shown in Figure 6b, the cylindrical projection 10 fits within the widened end of the hole 15 and clip 11 is clipped around the outer edge of the shelf. The remainder of the support member fits snugly within the rectangular cut-away portion 14, as shown more clearly in Figure 6a. The clip 11 of the support member 6 strengthens the fit between the shelf and the support member and tends to relieve downward pressure on the edge of the shelf or other module. This clip may clip around either the top or underside of the shelf, or there may be two clips on each support member to clip around both edges of the shelf. In Figure 6b, clip 11 is clipped around the bottom edge of the shelf.

The shaft of the locating member 5 is then directed through the hollow projection 10 of the support member 6 into the hole 15 within the shelf. The retaining member 7 is placed within hole 16 and the shaft of the locating member is brought into contact with the centre of the retaining member such that, upon rotation of either the retaining member, the locating member, or both, the external screw thread 9 of the locating member 5 cooperates with the internal screw thread 13 of the retaining member 7. The locating member 5 is thereby drawn further into (or out of) the shelf.

Preferably, a rectangular shelf has at least one attaching apparatus fitted towards each corner thereof to afford excellent stability. This results in there being at least two attaching apparatus fitted in each side of the shelf to be adjacent to a frame. To fit a shelf to a frame or a pair of frames, a hook 8 of each locating member 5 is attached to a bar 18 of a frame: This is shown in Figure 7a. By rotating retaining member 7 using finger pressure, a screwdriver or similar instrument, the end of each hook is pulled further in towards the side of the shelf by virtue of the cooperating screw threads, thus tightening the hook onto the frame bar 18 as shown in Figure 7b.

Optionally, a piece may be provided which is shaped to fix over one end of hole 16 in order to cover the retaining member 7 located within the hole once the shelf has been fitted. In this particular embodiment of the invention, opposite flats 17 of the retaining member should be aligned with opposite ends of hole 16 in order for a cover piece to be fixed over the hole. Thus the cover piece, in situ, is generally flush with the surface of the shelf or other module.

As a hook may be firmly tightened onto a frame bar using this apparatus, the shelf or other module to be attached need not be necessarily supported horizontally but alternatively could be supported between two frames at a non-horizontal inclination. Also, with at least two modules held tightly between frames, the frames become very stable and rigid. There is therefore no need for the frames 3 to be stabilised using rear cross members 19 as is often required in prior art systems, such as that shown in Figure 8. Conventionally, cross members were often found necessary for support. The present invention avoids the need for these cross-members.

A further major advantage of this system is that

the modules may be wider than the frames so that they protrude beyond the frames, as shown in Figure 9, but still be firmly supported. This was not possible in earlier systems because the modules could not be firmly supported and could easily be dislodged if knocked against or leaned upon towards their front edge, for example. The ability to support modules protruding beyond the frames is useful when the system is used to support computer and other equipment with keyboards, or when a shelf is used as a writing surface.

Figure 10 shows an alternative method of using this system: Frames 3 are fixed flat against a wall and shelves are mounted on the frames using attaching apparatus fitted to the back of each shelf. Figure 11 shows this system in more detail. In Figure 11, frame 3 is fixed to wall 20 using screws 21. In one example each frame is 12cm wide and the distance between neighbouring frames is 80cm. A bracket 22 is fixed to the underside of the shelf in order to support the shelf once it has been fitted to the frame. To fit the module to the frame, the back of the module with the bracket attached is held against the frame uprights and hook 8 is located over a bar 18 of the frame. Retaining member 7 is then rotated to pull the hook towards the shelf and tighten the shelf to the frame.

It will be appreciated that the attaching apparatus may also be used to fix other modules, such as cabinets or draw supports, to frames. The attaching apparatus could be fitted to either the bottom or top edges of such a module, or both for additional security.

CLAIMS

1. An apparatus for attaching a furniture module to a frame comprising; a locating member having a first portion for locating on a frame; a retaining member adapted to retain the locating member; and a support member having a portion adapted to lie within the body of the module and having an internal bore to accommodate therethrough an intermediate part of the locating member between the first portion and the retaining member; wherein the retaining member is adapted to draw the first portion of the locating member towards or away from the module.

2. An apparatus as claimed in Claim 1, wherein the first portion of the locating member comprises a hook to locate over a bar of a frame.

3. An apparatus as claimed in Claim 1 or Claim 2, wherein the locating member comprises a shaft having an external screw thread, and wherein the retaining member has an internal screw thread which cooperates with the external screw thread, such that the retaining member is rotatable to draw the first portion towards or away from the module.

4. An apparatus as claimed in any preceding claim, wherein the support member includes a cylindrical hollow projection to fit within the module and to accommodate the intermediate part of the locating member therethrough.

5. An apparatus as claimed in any preceding claim, wherein the support member includes at least one portion to clip around an edge of the module.

6. A modular furniture system comprising; at least one frame; at least one furniture module; and at least one attachment apparatus; wherein the attachment apparatus is as claimed in any preceding claim; and wherein the retaining member is positioned within the module and is externally accessible.

7. A modular furniture system as claimed in Claim 6, wherein the furniture module is a shelf, a cabinet or a draw support.

8. A modular furniture system as claimed in Claim 6 or Claim 7, further comprising a cover piece for fitting to the module to prevent access to the retaining member.

9. A furniture module adapted to accommodate an attachment apparatus therefor, wherein the attachment apparatus is as claimed in any one of Claims 1 to 5, and wherein the retaining member is positioned within the module and is externally accessible.

10. A method of assembling the modular furniture system claimed in any one of Claims 6 to 8, comprising fitting at least one attachment apparatus to the furniture module, locating the first portion of the locating member on a frame, and manipulating the retaining member to draw the first portion towards the furniture module, such that the furniture module is secured to the frame.

11. A method as claimed in Claim 10, wherein the furniture module is mounted between two parallel frames by attachment apparatus fitted to its side edges.

12. A method as claimed in Claim 11, wherein the width of the furniture module is greater than the width of the frames, such that the furniture module protrudes beyond the frames.

13. A method as claimed in Claim 10, wherein at least one frame is fixed to a surface and the furniture module is mounted thereon by attachment apparatus fitted to its back edge.

14. An attachment apparatus substantially as hereinbefore described, with reference to, and as illustrated by, Figures 2 to 7 and 9 to 11 of the accompanying drawings.

15. A modular furniture system substantially as hereinbefore described, with reference to, and as

illustrated by, Figures 2 to 7 and 9 to 11 of the accompanying drawings.

16. A method of assembling furniture, which method is substantially as hereinbefore described with reference to Figures 2 to 7 and 9 to 11 of the accompanying drawings.

C

**Patents Act 1977**
**Examiner's report to the Comptroller under Section 17**
**(The Search report)** -12-

Application number
GB 9315106.6

**Relevant Technical Fields**

(i) UK Cl (Ed.N) A4B A4L: LSD, LSHB F2M

(ii) Int Cl (Ed.6) A47B F16B

Search Examiner
MR J GRAHAM

Date of completion of Search
15 NOVEMBER 1994

**Databases** (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE: WPI

Documents considered relevant following a search in respect of Claims :-
1 TO 16

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| Category | Identity of document and relevant passages | | Relevant to claim(s) |
|---|---|---|---|
| E, X | GB 2274698 A | (CLARK) see Figure 1; see support body 1 | 1 to 5 |
| X | GB 2246407 A | (ATKINS) see Figure 1 | 1, 3, 6, 9, 10 |
| X | GB 1455295 | (COMENS) see eg. Figures 3, 4 | 1 to 4, 6, 7, 9 |
| X | GB 1067091 | (STEWARTS) see eg. Figures 1 and 4 | 1 to 4 |
| X | GB 665974 | (DIRCKX) see Figure 7; see support member 21 | 1 to 4, 6, 7, 9 |

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